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09/767,925	01/23/2001	Kaius Kiiren Polikarpus	DP-300566	1447

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EXAMINER	
OLSEN, KAJ K	

ART UNIT	PAPER NUMBER
1753	7

DATE MAILED: 04/11/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Applicati n No. 09/767,925	Applicant(s) POLIKARPUS ET AL.	
	Examiner Kaj Olsen	Art Unit 1753	

-- The MAILING DATE f this communication appears on the cover sheet with the correspondence address --

P riod for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 January 2003* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-32,36 and 37* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-32,36 and 37* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 5.5
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Information Disclosure Statement

1. Certain documents in the information disclosure statement filed November 5, 2002 have not been considered. Miyoshi et al has been previously considered. The application of 09/741,498 has also not been considered because it is not a U.S. Patent Document, nor is it a document that qualifies as prior art under 35 U.S.C. 102. The examiner has only considered the document with respect to double patenting issues.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1, 4, 6-16, 18, 20-22, 25-32, 36, and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sugiyama et al (USP 6,258,233) in view of Friese et al (USP 4,221,650) with evidence provided by Practical Handbook of Material Science.

5. With respect to claim 1, Sugiyama discloses a method of manufacturing a zirconia-alumina body that comprises mixing zirconia, yttria, and at least one solvent to form a mixture (col. 7, lines 48-56). Said mixture is dried (col. 7, line 60) and disposed adjacent to an unfired alumina body (13 and/or 16) and the zirconia and the alumina bodies are co-fired together (col. 8, lines 11-19 and lines 34-38). The zirconia utilized by Sugiyama comprises a percentage of monoclinic phase, as measured from the diffraction intensities, that varies between 5 and 25 % based on the total weight of zirconia (col. 2, lines 38-50).

6. Sugiyama does not explicitly suggest also including alumina to the zirconia mixture, Friese teaches in an alternate method for preparing zirconia for electrochemical sensors that adding alumina to the zirconia mixture improves the heat conductivity of a constructed sensor while also reducing its coefficient of expansion (col. 3, lines 2-6). It would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize the teaching of Friese for the method of Sugiyama in order to improve the constructed sensors heat conductivity and reduce its coefficient of expansion.

7. With respect to claims 4, 7, and 8, see Sugiyama, col. 7, lines 55-57.

8. With respect to claim 6, Sugiyama particularly teaches the use of compositions between 18 and 25 % monoclinic (fig. 13 and tables 1-3).

9. With respect to claim 9, although neither Sugiyama nor Friese specify a particular sintering mismatch, this would appear to the examiner to be a function of the percentage of

monoclinic zirconia utilized for the body (as taught by Sugiyama) and/or the addition of alumina to the mixture (as taught by Friese). Hence the method as set forth above would inherently produce a laminated mixture and alumina surface having the claimed mismatched.

10. With respect to claims 10 and 11, see Sugiyama, col. 13, lines 19-22.

11. With respect to claim 12, see Sugiyama, col. 7, line 54.

12. With respect to claims 13 and 14, Sugiyama teaches the use of 6 mol% yttrium oxide (col. 7, lines 50 and 51) and Friese has embodiments of 4 and 7 % by volume Al2O3 (the table on col. 9). Although Friese reports these quantities in terms of volume, the Practical Handbook of Materials Science evidences that these compositions read on mol percentages of claims 13 and 14 even when the differences in density and molecular weight between alumina and zirconia are taken into account.

13. With respect to claim 15, see Sugiyama, col. 7, line 65 through col. 8, line 3.

14. With respect to claim 16 (those limitations not covered above for claim 1), Sugiyama teaches disposing an electrode onto each side of the unfired zirconia body and connecting each electrode to an electrical lead (col. 7, line 65 through col. 8, line 3).

15. With respect to claim 18, layers 16 and 22 would constitute support layers and a heater 25 is disposed within the support layers (fig. 1).

16. With respect to claims 20-22 and 25-32, see the previous rejections for claims 6, 6, 4, and 7-14 respectively.

17. With respect to claims 36 and 37, although Sugiyama does not specify the claimed level of purity, one possessing ordinary skill in the art would clearly appreciate that a more pure

starting material would produce a better performing electrochemical sensor, and the use of highly pure starting materials requires only routine skill in the art.

18. Claims 2, 3, and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sugiyama in view of Friese as applied to claims 1 and 22 above, and further in view of Aizawa et al (USP 5,968,673).

19. The references set forth all the limitations of the claims, but did not explicitly set forth the presence of a dispersant in the mixture. Aizawa teaches in an alternate solid electrolyte construction that adding a dispersant to a ceramic mixture (i.e. slurry) improves the dispersion of the particles in the slurry allowing for a more homogeneous mixture (col. 4, lines 20-27). It would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize the teaching of a dispersant in order to create a homogeneous mixture of the electrolyte particles. With respect to the concentration of monoclinic zirconia in the zirconia-alumina, see the rejection for claim 6 above. With respect to the particular composition of the dispersant, Aizawa teaches the use of a phosphate ester (col. 4, lines 26 and 27).

20. Claims 5 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sugiyama in view of Friese as applied to claims 1 and 22 above, and further in view of Wang (USP 4,897,174).

21. The references set forth all the limitations of the claims, but did not explicitly recite the step of de-airing the mixture. Wang teaches in an alternate electrochemical sensor construction that exposing a ceramic mixture (i.e. a slurry) to a vacuum (i.e. de-airing) ensures that the slurry possesses no trapped air (col. 3, lines 32-34). It would have been obvious to one of ordinary skill

in the art at the time the invention was being made to utilize the teaching of Wang for the method of Sugiyama and Friese in order to ensure that there is no trapped air in the mixture.

22. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sugiyama and Friese as applied to claim 16 above, and further in view of Kojima et al (USP 5,849,165).

23. The references set forth all the limitations of the claim, but Sugiyama did not explicitly suggest disposing a protective layer adjacent to the unfired zirconia on a side opposite the alumina side. Kojima teaches in an alternate sensor that the application of a protective layer over the measuring electrode protects said electrode from Si-poisoning (col. 2, lines 3-27). It would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize the teaching of Kojima for the method of Sugiyama in view of Friese in order to protect the sensor from silicon poisoning.

24. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sugiyama in view of Friese as applied to claim 18 above, and further in view of Lankheet (USP 6,346,178).

25. The references set forth all the limitations of the claim, but did not explicitly recite the presence of a ground plane between the heater and the alumina body. Lankheet teaches in an alternate electrochemical sensor that the inclusion of a ground plane 42 can prevent the premature failure of the heater (col. 4, lines 52-64). It would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize the teaching of Lankheet for the method of Sugiyama and Friese in order to prevent the premature failure of the heater.

Response to Arguments

26. Applicant's arguments filed 1-23-2003 have been fully considered but they are not persuasive. With respect to the reference Sugiyama, applicant urges that the specified 5 to 25% of monoclinic zirconia is not the percentage of monoclinic zirconia based on the total weight of the zirconia, but only the total percentage of monoclinic (M) and cubic (C) zirconia. Because the materials of Sugiyama can also comprise tetragonal (T) phase, the 5-25% of Sugiyama does not teach the claimed 1 to 45% of claims 1 and 16. This is not persuasive for a number of reasons. First, Sugiyama evidences that the zirconia materials at the specified levels of yttria only consist of the monoclinic and cubic phases of the zirconia and any tetragonal zirconia would be converted back to monoclinic zirconia (fig. 18, and col. 1, line 66 through col. 2, line 11). Hence, the 5-25% percent specified by Sugiyama would in fact be the percentage of monoclinic zirconia in the total zirconia at temperatures below 200 °C because tetragonal zirconia would only be present in negligible amounts because it is not stable at those temperatures (i.e. the structure would be overwhelmingly monoclinic and cubic). Although Sugiyama discloses that the specified electrolyte can contain a portion of the T phase zirconia even at room temperature, only particular conditions allow that to occur. Sugiyama teaches that the presence of the T phase can be suppressed and converted back into M phase based on grain sizes (col. 4, lines 26-36) or post treatment of the ceramic (col. 9, lines 63-66). The claims of the instant invention placed no limitations concerning how the zirconia-alumina body is post-treated or place any conditions of choice of sintered grain sizes. Because Sugiyama teaches suppressing the T phase at 200 °C in water or with the use of particular grain sizes, the specified M/C ratios of Sugiyama for said

electrolytes would therefore be the same thing as the ratio of M to the total zirconia concentration.

27. In addition, even if the examiner were to interpret the fact that some of the embodiments of Sugiyama have the T phase (and consequently, the M/C ratios of Sugiyama are not the same thing as an M/total zirconia ratio), Sugiyama would still anticipate the claimed range of monoclinic zirconia. In particular, Sugiyama teaches an M/C percentage of 5 to 25%. The instant invention claims a percentage of anywhere from 1 to 45% monoclinic zirconia. In order for Sugiyama to fail to have a monoclinic percentage of at least 1% (as required by the claims), the zirconia of Sugiyama would have to comprise greater than 79 % T phase for an M/C of 0.05 (i.e. <1 part M, <20 parts C, >79 parts T), or greater than 95% T phase for an M/C of 0.25 (i.e. <1 part M, <4 parts C, and >95 parts T) in order for Sugiyama to read away from the broad claimed percentage. This is an impossibility. The T phase is only created from the M phase and the materials of Sugiyama only contain a minority amount of the M phase with respect to the C phase (too much M results in too much T-M cracking). Furthermore, the T phase is only stable against returning to the M phase at lower temperatures provided the T portions are surrounded by C phase (and only "part" of that T phase can be maintained) (col. 4, lines 14-25). How can 95% of a T phase be surrounded by only 4% of a C phase.

28. The applicant's remaining traversals merely amplify the applicant's belief that Sugiyama does not teach the required percentages of monoclinic zirconia. Because the arguments concerning Sugiyama were not persuasive, these further arguments are also not persuasive.

Conclusion

29. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kaj Olsen whose telephone number is (703) 305-0506. The examiner can normally be reached on Monday through Thursday from 7:00 AM-4:30 PM. The examiner can also be reached on alternate Fridays.

If attempts to reach the examiner are unsuccessful, the examiner's supervisor, Mr. Nam Nguyen, can be reached at (703) 308-3322.

When filing a fax in Group 1700, please indicate in the header "Official" for papers that are to be entered into the file, and "Unofficial" for draft documents and other communications with the PTO that are not for entry into the file of this application. This will expedite processing of your papers. The fax number for regular communications is (703) 305-3599 and the fax number form after-final communications is (703) 305-5408.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist, whose telephone number is (703) 308-0661.

Kaj K. Olsen
Patent Examiner
AU 1753
March 29, 2003

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